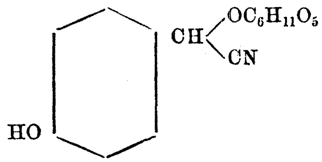
large arterial trunk in its continuity does not find, on clearing the vessel of its sheath with the point of his knife, that he is dealing with a body that swells at every pulse, but with one of unvarying dimensions." Experimenting on the metacarpal artery (horse) with the circulation going on, he found that transverse measurements with suitable callipers showed no change as long as the limb was kept in any one position.

"Cyanogenesis in Plants. Part II.—The Great Millet, *Sorghum vulgare*."* By WYNDHAM R. DUNSTAN, M.A., F.R.S., Director of the Scientific Department of the Imperial Institute, and T. A. HENRY, D.Sc. Lond. Received April 24,—Read May 15, 1902.

(Abstract.)

The authors have investigated the nature of the poison contained in the young plants of *Sorghum vulgare*, the Great Millet or Guinea Corn (the *Juár* of India or *Dhurra shirshabi* of Egypt). This plant is cultivated in tropical countries for the sake of the seed, which is important as a food grain. The young plants have proved fatal to animals, especially in Egypt, where the attention of the authors was directed to the subject by Mr. E. A. Floyer, of Cairo, who has kindly provided the material required for the investigation.

The authors show that the young plant, but not the seeds or old plants, when crushed with water furnishes prussic acid (about 0·2 per cent. of the dried plant). The acid is not present in the free state, nor is it produced by acting on the plant with boiling water or with alcohol. The production of the poison is due to the action of a hydrolytic enzyme, apparently identical with the emulsin of bitter almonds on a cyanogenetic glucoside which has been named "dhurrin," from the Arabic name for the plant, "dhurra." This glucoside has been proved to be derived from parahydroxymandelic nitrile by the association of the residue of one molecule of dextrose. Its formula is therefore $C_{14}H_{17}O_7N$,



* The authors' previous paper, entitled "The Nature and Origin of the Poison of *Lotus arabicus*" ('Proceedings,' vol. 67, 1900, p. 224; vol. 68, 1901, p. 374; and 'Phil. Trans.,' B, vol. 194, 1901, p. 515), is to be regarded as Part I of this series.

Dhurrin crystallises well, and is soluble in both water and alcohol. When hydrolysed by emulsin or by dilute acids it is converted into parahydroxybenzaldehyde, dextrose, and hydrocyanic acid according to the equation $C_{14}H_{17}O_7N + H_2O = C_7H_6O_2 + C_6H_{12}O_6 + HCN$. When warmed with alkalis, dhurrin is resolved first into dhurrinic acid and ammonia This acid subsequently undergoes further hydrolysis when warmed with dilute hydrochloric acid, being converted into parahydroxymandelic acid and dextrose (1) $C_{14}H_{17}O_7N + H_2O = C_{14}H_{18}O_9 + NH_3$, (2) $C_{14}H_{18}O_9 + H_2O = C_8H_8O_4 + C_6H_{12}O_6$.

The identity of the parahydroxymandelic acid was established by its synthesis from the cyanhydrin of parahydroxybenzaldehyde.

Dhurrin differs from the other two known cyanogenetic glucosides, the amygdalin of bitter almonds and the lotusin found by the authors in *Lotus arabicus*, in being derived from dextrose and not from maltose.

The authors point out the protective purpose served by the existence of the cyanogenetic glucoside in the young plant.

The authors intend to fully investigate the several problems which are raised by the occurrence of cyanogenetic glucosides in plants.

They are at present engaged in examining several other plants which have furnished prussic acid, among them being *Manihot utilissima*, *Linum usitatissimum*, *Lotus australis*, and *Phaseolus lunatus*.

"On the Continuity of Effect of Light and Electric Radiation on Matter." By JAGADIS CHUNDER BOSE. Communicated by LORD RAYLEIGH, F.R.S. Received April 18,—Read June 20, 1901.

Introduction.

Though the theory of coherence gives a simple explanation of many cases of diminution of resistance in a mass of metallic particles under electric radiation, yet there are other cases which are not explicable by that theory. If coherence be due to electric welding, it would follow that *all* sensitive particles would exhibit a permanent diminution of resistance; in other words, the action should be non-discriminative and there should be no self-recovery. In my previous paper,* however, I have shown that the effect of radiation is by no means non-discriminative. To the contrary, while its effect on the positive class of substances, *e.g.*, Mg.Fe.Ni, is a diminution of resistance, it acts on the negative class, *e.g.*, K.Ag′.Br.I, in a precisely opposite way, that is to say, it produces in these an increase of resistance. Further, the conduc-

* "On Electric Touch and Molecular Changes produced in Matter by Electric Waves," 'Roy. Soc. Proc.,' vol. 66.